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Intermolecular Relaxation Process in Carbon Dioxide Dimers and Oxygen Dimers WAEL ISKANDAR, AVERELL GATTON, BISHWANATH GAIRE, KIRK LARSEN, ELIO CHAMPENOIS, NIRANJAN SHIVARAM, Lawrence Berkeley National Laboratory, JOSHUA WILLIAMS, University of Nevada, TRAVIS SEVERT, ITZIK BEN-ITZHAK, Kansas State University, TILL JAHNK, REINHARD DÖRNER, University of Frankfurt, DANIEL SLAUGHTER, THORSTEN WEBER, Lawrence Berkeley National Laboratory — Excited systems embedded in an environment can efficiently transfer their energy to neighboring species via an ultrafast de-excitation mechanism known as the Inter-Coulombic Decay (ICD). Significantly more studies have been carried out on atomic clusters versus molecular clusters. Compared to atomic clusters, new questions arise in the investigation of molecular clusters, e.g., how does the higher structural complexity of molecular clusters affect ICD? What other ultrafast relaxation processes can be present, and how do they compete with ICD? To tackle these questions, we have investigated the fragmentation dynamics of CO_2 dimers and O_2 dimers after single XUV photon absorption. Specifically, we focused on the investigation of the symmetric fragmentation channels of the doubly charged dimers using COLTRIMS to measure the particles 3D momenta. We found that the direct dissociation or autoionization of CO_2^{+*} is suppressed due to the fast relaxation of the dimer via ICD. For O_2 dimers the relative emission angle between the two electrons showed contributions from ICD as well as knock-off processes [1].

[1]W. Iskandar et al., Phys. Rev. A **99**, 043414

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